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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/736,955	12/15/2003	Jizheng Xu	MS1-1694US	5538

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LEE & HAYES, PLLC
601 W. RIVERSIDE AVENUE
SUITE 1400
SPOKANE, WA 99201

EXAMINER

WERNER, DAVID N

ART UNIT	PAPER NUMBER
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2621

NOTIFICATION DATE	DELIVERY MODE
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ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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lhptoms@leehayes.com

Office Action Summary	Application No. 10/736,955	Applicant(s) XU ET AL.	
	Examiner David N. Werner	Art Unit 2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 April 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14, 16-23, 25-32 and 34-39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 19-23, 25-32, 34-36, 38 and 39 is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-14, 16-18 and 37 is/are rejected.
- 7) ☒ Claim(s) 6 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 August 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office action for U.S. Patent Application No. 10/736,955, is responsive to communications filed 30 April 2010, in reply to the Non-Final Rejection of 7 January 2010 and the interview of 5 April 2010. Claims 1–14, 16–23, 25–32, and 34–39 are pending. Of those, Claims 37–39 are new.

2. In the previous Office action, Claims 6, 15, 24, and 33 were objected to for each failing to limit a previous claim. Claims 1–36 were rejected under 35 U.S.C. § 103(a) as obvious over U.S. Patent Application Publication No. 2003/0058931 A1 (*Zhang*) in view of U.S. Patent Application No. 2003/002579 A1 (*Radha*) and in view of U.S. Patent No. 5,742,343 A (*Haskell*). In the interview of 5 April 2010, agreement was reached as to suggested claim language that would bring the claims more closely in line with the specification, but no agreement was reached as to the patentability of the claims over the prior art. The examiner disputes Applicant's assertion in the "Statement of Substance of Interview" that it was agreed at the time that "at least claim 1, as presented herein, overcomes the pending rejection".

Response to Amendment

3. Applicant's amendment to Claim 6 has been fully considered and is sufficient to overcome the objection as not further limiting Claim 1.

Response to Arguments

4. Applicant's arguments with respect to Claims 1 and 10 have been considered but are moot in view of the new ground(s) of rejection.
5. Applicant's arguments with respect to Claims 19 and 28 have been fully considered and are persuasive. The prior art rejections of Claims 19–23, 25–32, 34–36, 38, and 39 have been withdrawn.

Specification

6. The disclosure is objected to because of the following informalities: in the sixth line of paragraph 0034, the word "extracts" should be "extract". Appropriate correction is required.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

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not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 1–5, 7–14, 16–18, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication 2003/0058931 (*Zhang*) in view of U.S. Patent Application Publication 2003/0002579 A1 (*Radha*) and in view of U.S. Patent No. 6,700,933 B1 (*Wu*). The applied *Wu* reference has a common assignee and two common inventors, Feng Wu and Shipeng Li, with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention “by another”; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(I)(1) and § 706.02(I)(2).

Zhang teaches a method of transcoding scalable video comprising a base layer and enhancement layer. Regarding independent claim 1, figure 5 of *Zhang* illustrates the transcoder system, performed in a server for video transmission. *Zhang* at paragraph 0014. The input video is first encoded with FGS encoder 510 as a scalable bitstream with a base layer and enhancement layer. *Id.* at ¶ 0048. This is the claimed step of obtaining the bitstream of encoded video data. After initially encoding the base and enhancement layers, in transcoding, enhancement layer 512 is transcoded in transcoder 540 to output enhancement layer video 519. *Id.* at ¶ 0050. The transcoded enhancement layer 519 and original base layer 511 may be stored on a disc or transmitted over a network. *Id.* at 0051. Then, transcoder 540 performs the claimed step of decoding the enhancement layer bitstream from the encoded video. This transcoding is performed based on minimizing distortion for a current available bitrate and adjusts rate budget $W(a)$ based on network conditions in a bit-rate allocation scheme. *Id.* at ¶¶ 0054, 0073. Then, Rate-Distortion Extractor 520 performs the claimed step of "determining data throughput characteristics of a network coupled to a client computing device", and "calculating a new HQRB" to determine "how many bits of the enhancement layer bitstream are used to reconstruct a high quality reference image", where $W(a)$ is the HQRB. Then, transcoder 540 which produces the new enhancement layer bitstream performs the claimed step of "encoding the enhancement layer bitstream".

The present invention differs from *Zhang* first in that the present invention determines the new HQRB as the difference between network bandwidth and encoded

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base layer bandwidth, whereas *Zhang* calculates a bit rate for the video as a whole, without separating base layer and enhancement layer throughputs; and second in that the present invention extracts motion vectors from the base layer for transcoding the enhancement layer, whereas in *Zhang*, the enhancement layer transcoding is completely independent from the base layer.

Radha teaches a system for transmitting video over a variable-bandwidth network, in which the video, comprising a base layer and enhancement residual layers, may change coding according to variable bandwidth. Regarding claim 1, in *Radha*, a selected enhancement layer bitstream is encoded at a rate $R(\text{MAX}) - R(\text{BL})$ (paragraph 0049), in which $R(\text{MAX})$ is the maximum available network bandwidth (paragraph 0040), and $R(\text{BL})$ is the bitrate of an encoded base layer (paragraph 0041). If available bandwidth is reduced to a smaller value R less than $R(\text{MAX})$, the transmitter adjusts to output an enhancement layer of bandwidth $R - R(\text{BL})$ (paragraph 0051). Then $R - R(\text{BL})$ is the claimed "difference between the data throughput characteristics of the network and a bit rate of the encoded base layer", and the video output in *Radha* is "at least partially optimized for the throughput characteristics of the content distribution network".

Zhang discloses a majority of the claimed invention except for determining bit rate of an enhancement layer as the difference between available bit rate and base layer bit rate. *Radha* teaches that it was known in the art to provide this determination of bitrate. Therefore, it would have been obvious to one having ordinary skill in the art at the time the present invention was made to substitute the enhancement layer bitrate

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determination control of *Radha* for the bitrate determination control of *Zhang* with the predictable result of producing "a coded residual image which is most appropriate for the available bandwidth", (paragraph 0012), that is to say, "at least partially optimized for the throughput characteristics of the content distribution network", since it has been held that simple substitution of one element in the art for another to obtain predictable results only involves routine skill in the art. *In re Fout*, 675 F.2d 297, 301, 213 USPQ 532, 536 (CCPA 1982); *In re O'Farrell*, 853 F.2d 894, 7 USPQ2d 1673 (Fed. Cir. 1988); *Ruiz v. AB Chance Co.*, 357 F.3d 1270, 69 USPQ2d 1686 (Fed. Cir. 2004); *Ex Parte Smith*, 83 USPQ 2d 1509 (BPAI 2007). However, *Radha* does not resolve the deficiency of extracting motion vectors from an encoded base layer.

Wu teaches an FGS encoder and decoder. Regarding Claim 1, figure 20 illustrates the decoder. In base layer decoder 602, variable length decoder 620 partially decodes a base layer bit stream, and recovers motion vectors. *Wu*, col. 21, lines 31–33. The output of the variable length decoder can still be said to be an "encoded base layer" according to the present invention, since paragraph 0034 of the specification states that "VLD decoding to extracts[sic] the MVs is not the same as decoding the base layer". The extracted motion vectors from the base layer VLD are used in enhancement layer motion compensator 624. *Id.* at col. 21: lines 33–34, 49–52. It is respectfully submitted that this process of extracting motion vectors from a base layer VLD and using them for enhancement layer processing is analogous to the claimed process of extracting motion vectors from the encoded base layer while skipping other information, as claimed and as described in paragraph 0034 of the specification. By placing the *Wu*

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base layer motion vector extraction in the *Zhang* transcoder as modified by *Radha*, the present invention is achieved.

Zhang, in combination with *Radha*, discloses the claimed invention except for using base-layer motion vectors to encode an enhancement layer in a video coder. *Wu* teaches that it was known to extract base layer motion vectors from an encoded base layer bitstream in the manner described in the present invention. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the base layer motion vector extraction of *Wu* into the enhancement layer transcoder of *Zhang*, that is, to use base layer motion vectors for processing the enhancement layer, since *Wu* states in the abstract that such a modification would prevent fluctuations in quality in the enhancement stream, particularly when there are a plurality of enhancement layers.

Regarding Independent Claim 10, all other things equal to Claim 1, this claim is directed to a computer or processor-operated software memory embodiment of the Claim 1 method. However, at least *Radha* operates on a personal computer, and so is considered to encompass the claimed embodiment. *Radha*, ¶¶ 0032–0035.

Regarding Claims 2 and 11, as previously mentioned, the enhancement layer rate selection control in *Radha* was designed to produce the enhancement layer "most appropriate for the available bandwidth". *Radha*, ¶ 0012.

Regarding Claims 3 and 12, *Zhang* operates on FGS-encoded video. *Zhang*, ¶¶ 0018–0019.

Regarding Claims 4 and 13, in *Radha*, when a receiver bandwidth decreases, an enhancement layer of residual images having a lower bit rate is selected, and regarding Claims 5 and 14, in *Radha*, when a receiver bandwidth increases, an enhancement layer of residual images having a higher bit rate is selected. *Radha*, ¶ 0014.

Regarding Claims 7 and 16, in *Zhang*, the base layer 511 and transcoded enhancement layer 512 may be "transmitted through a network 550 synchronously as they are transcoded". *Zhang*, ¶ 0051.

Regarding Claims 8 and 17, in *Zhang*, FGS encoder 510 performs the encoding of the base layer and the original input enhancement layer. *Zhang*, ¶ 0048.

Regarding Claims 9 and 18, in *Radha*, a maximum bit rate may be determined based on if "the receiving device has sufficient processing power to handle those additional frames" produced at a higher bit rate. *Radha*, ¶ 0005.

Regarding Claim 37, in the *Wu* decoder shown in fig. 20, a bitstream containing coefficients for a current frame, extracted in enhancement layer IDCT 674 or 644, comprises the claimed second group of coefficients for the video to be transcoded. A reconstructed previous enhancement frame, stored in frame buffer 652 and used as reference frames for motion compensator 624 comprises the claimed first group of coefficients for the high-quality reference. *Wu*, col. 21; lines 55–56.

Allowable Subject Matter

10. Claims 19–23, 25–32, 34–36, 38, and 39 are allowed.

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11. Claim 6 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. Claim 10 would be allowable if the fourth indentation, step (c), were amended to recite "using the encoded base layer bitstream without decoding the encoded base layer bitstream" rather than "while keeping the bitstream of the encoded base layer unchanged".

13. The following is a statement of reasons for the indication of allowable subject matter: the claims are directed to transcoding the enhancement layer alone, while extracting the motion vectors from the encoded base layer, but performing no additional decoding on the base layer. *Wu*, the closest prior art, describes an FGS decoder that extracts motion vectors from an encoded base layer for use in an enhancement layer decoder, but then proceeds to complete decoding of the base layer. The partial decoding of the base layer only to extract motion vectors for use in the enhancement layer transcoder is patentable over the prior art.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent No. 6,480,547 B1 (*Chen*) discloses an FGS encoder and decoder in which dequantized base layer coefficients are used in the enhancement layer decoder. U.S. Patent No. 7,003,034 B2 (*Roh*) discloses an FGS encoder and decoder in which data from a base-layer VLD in a decoder is used to extract residual

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data in the enhancement layer. U.S. Patent Application Publication No. 2002/0118743 A1 (*Jiang*) teaches an FGS encoder and decoder that uses a completely decoded base layer video for decoding the enhancement layer. U.S. Patent Application Publication 2006/0133475 (*Bruls*), describes an FGS encoder and decoder with a decoder similar to that of *Wu*, but with the additional step of upscaling extracted motion vectors from the encoded base layer for use in enhancement layer decoding.

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David N. Werner whose telephone number is (571)272-9662. The examiner can normally be reached on Monday-Friday from 8:30 to 5:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on (571) 272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. N. W./

Examiner, Art Unit 2621

/Mehrdad Dastouri/

Supervisory Patent Examiner, Art Unit 2621